In the "Outlines of the History of Ethics for English Readers," Sidgwick has supplied a most useful guide to the study of the subject. In the "Principles of Political Economy" (1st ed., 1883; 2nd, 1887) and in "The Scope and Method of Economic Science" (1885), there is a return to the older English thought, but the subject is treated with an acuteness and originality specially characteristic of Sidgwick's intellect, which have given to these works real value as contributions to economic science. The third book of the principles contains the "Art of Political Economy," which, together with "The Elements of Politics" (1st ed., 1891; 2nd, 1897), shows the keen interest always felt by Sidgwick in political and social questions, and the practical sagacity with which he handles these problems. In politics, Sidgwick combined the freedom from prejudice of the Radical with the caution of the Conservative.

Perhaps the most important practical work with which the name of Sidgwick has been associated is in connection with the higher education of women. He was the virtual founder of Newnham College, through the scheme of lectures for women which he initiated in 1869, and the house of residence which he started and persuaded Miss Clough to take charge of in 1871. In 1880, Mrs. Sidgwick having consented to become vice-principal of the second Hall of the College just opened, they both came to live there for two years; and when, after Miss Clough's death in 1892, Mrs. Sidgwick became principal of the College, they made it their permanent home.

In 1882 Sidgwick accepted the presidency of the newly formed Society for Psychical Research, in the subject-matter of which he had been interested for many years. The spirit which has characterised the proceedings of the Society, and the success which it has achieved, have been largely due to the sobriety and wisdom of Sidgwick's constant counsel and control.

PROF. JAMES EDWARD KEELER.[1]

THE sudden death of Prof. James E. Keeler, director of the Lick Observatory, which occurred at San Francisco on August 12, removes one who stood at the very forefront of astrophysical research.

James Edward Keeler was born at La Salle, Illinois, on September 8, 1857. His qualifications for scientific work clearly showed themselves at the Johns Hopkins University, where he took an undergraduate course, and served as assistant to Prof. Hastings, with whom he observed the total solar eclipse of 1878 in Colorado.

Shortly after this he was appointed assistant at the Allegheny Observatory, where he had an important part in the long series of bolometric investigations carried on by Prof. Langley, then director of the Observatory. In July 1881 he was a member of Prof. Langley's well-known expedition to Mount Whitney, in Southern California, where an extensive region in the extreme infra-red of the solar spectrum was discovered with the bolometer. Later he studied for two years in Berlin and Heidelberg under Helmholtz and Quincke, and returned to the Allegheny Observatory, where he remained until appointed a member of the staff of the Lick Observatory. His work on Mount Hamilton commenced in 1885, and for some time he was the only astronomer at the Observatory, which was still in process of construction. In May 1891 he was elected professor of astrophysics in the Western University of Pennsylvania and director of the Allegheny Observatory.

Keeler's work at the Lick Observatory was continued in a most effective manner with the modest instrumental resources at Allegheny. With a full understanding of the art of making the most of his means, he took up photography for the first time, made himself thoroughly familiar with photographic processes, and then, with the aid of a spectrograph whose general design has been followed in the construction of the great modern spectrographs at Mt. Hamilton, Potsdam, Pulkowa and Williams Bay, he obtained the photographs of the spectra of red stars which excited so much interest at the dedication of the Yerkes Observatory. He also made an admirable series of drawings of Mars, which was published in the *Memoirs* of the Royal Astronomical Society.

In the spring of 1898 Keeler had practically decided to accept a position on the staff of the Yerkes Observatory, and would have done so had he not just then been appointed director of the Lick Observatory. His recent work on Mt. Hamilton has not been confined to the direction of the affairs of a great observatory. The remarkable success of his experiments with the Crossley reflector, of which a full account is fortunately preserved in the June number of the *Astrophysical Journal*, has impressed every one who has seen the wonderful photographs of nebulæ and star clusters made with this instrument.

Of Keeler's other contributions to science two in particular deserve present mention: his determination with the Lick telescope of the motion in the line of sight of the planetary nebulæ, and his demonstration of the meteoric constitution of Saturn's rings. The memoir which describes the first of these investigations already ranks as a classic of astrophysical literature; while the spectroscopic demonstration of the meteoric constitution of Saturn's rings is perhaps the most striking of the many effective applications which have been made of Doppler's fruitful principle.

Much more might be said of Keeler's work, but this should suffice to indicate its lasting value. It is a satisfaction to add that its merit has been widely appreciated, as has recently been evidenced by the award of the Draper and Rumford medals. He was president of the Astronomical Society of the Pacific and a councillor of the Astronomical and Astrophysical Society of America. He was elected an Associate of the Royal Astronomical Society in 1898 and a member of the National Academy of Sciences at its last meeting. His kindly and genial manner, combined with unusual tact and rare judgment, drew to him many friends, who will long mourn his loss.

[1] Abridged from an obituary notice contributed to *Science* of September 7 by Prof. George E. Hale.

NOTES.

THE annual meeting of the Iron and Steel Institute was opened at Paris on Tuesday with an address by the president, Sir W. Roberts-Austen, K.C.B., F.R.S. It was announced that Mr. Andrew Carnegie has offered to the Institute the sum of 6500*l.* for the purpose of founding a medal and scholarship to be awarded for any piece of work that may be done in any works or University, and to be open to either sex.

IT is stated by the Paris correspondent of the *Times* that M. Yersin, to whom the Academy of Moral Sciences recently awarded a prize of 15,000 francs for philanthropic acts, has devoted the sum to his anti-plague serum establishment at Nha-trang.

THE *British Medical Journal* announces that the prize of 4000 marks voted by the Berlin Congress of Tuberculosis for the best popular work on tuberculosis as a social scourge, and the means of preventing its ravages, has been awarded to Dr. S. A. Knopf, of New York. The work will be published by the German Central Committee.

A TABLE of standard sizes of conductors for electric supply mains has been drawn up by the Cable Makers' Association and sent to electrical engineers. The table shows the nominal

size of conductors, in square inches, number and diameter of strands, resistance in standard ohms per 1000 yards, and weight in lbs. per 1000 yards. It is proposed to adopt the sizes and combinations of conductors shown in the table as the basis for tenders, beginning on October 1.

THE list is now completed of the subjects to be discussed at the International Botanical Congress to be held in Paris from the first to the tenth of October, in connection with the Exposition, and promises a time of varied interest from both a structural and an economical point of view. Those who wish to become members, and thus to obtain the results of the Congress, should send their subscriptions (20 fr.) to M. H. Hua, Treasurer to the Congress, 2 Rue de Villersexel, Paris.

FIVE additional cases of plague, of a mild type, were reported in Glasgow on Monday. This raises the total to twenty-two plague cases, one suspected case, and 115 persons under observation. The attacked persons had been in contact with plague cases. Prof. Muir states in his report on the new cases that his experiments show without doubt that the bacillus was that of bubonic plague. He examined nine cases, both microscopically and by means of culfures, and found the same results.

AT the Geographical Congress at Berlin in October 1899 it was decided to form an International Seismological Society. The first meeting of the delegates from different countries will be held at Strassburg on April 11, 1901. The principal subjects chosen for discussion are: The organisation and extension of macroseismic investigations in all countries, the organisation of international microseismic observations, the selection of apparatus for international and local seismic observations, the annual publication of international seismic reports, and the statutes of the new society.

THE Liverpool Marine Biology Committee's station at Port Erin has been very fully occupied during the greater part of the summer, and there are at present half-a-dozen workers doing original research in the laboratory. On Saturday last a party of the Isle of Man Natural History and Antiquarian Society proceeded to Port Erin on a visit to the laboratory, and were heartily welcomed by Prof. Herdman, F.R.S. Mr. Isaac C. Thompson gave a lecture, "On the Place of the Copepoda in Nature." It was pointed out that the copepoda are of the utmost value as scavengers, as they live on the products of decomposition, putrefaction, drainage matter, &c., and by their internal laboratories convert refuse matter into most valuable food material, some copepoda constituting one of the chief sources of food for fishes, and therefore of man. Mr. Thompson said that no less than 200 species have been found in Liverpool Bay. Their beautiful organisation illustrates the truth that the wonderful structure of some animals, which can only be studied with the microscope, shows them to be as full of interest as those familiar to our ordinary vision. Besides the many free swimming copepods, there are many species found as fish parasites, living on the gills and on other external parts of our common fishes; some of these are nourished by the fish and do harm, while others do not, their presence being rather an advantage than otherwise.

THE importance of an organised and continuous system of rainfall observations is obvious to every one possessing sufficient knowledge of physical geography to know the relation of rainfall to agriculture, water supply, and all questions in which the development of natural resources is concerned. It is as essential that such observations should be systematically carried on in a thickly populated country like our own as it is that they should be made in all parts of the British Empire in which observers can be found. And when stations have been established, it is again essential that there should be a central bureau in which the observations can be collected, and their relation to one another, and to the natural features of the district determined. A report, by Mr. F. R. Johnson, upon irrigation and water supply, rainfall, and water rights in Cape Colony, published in the *Cape Agricultural Journal* (August 2), issued by the Department of Agriculture, reminds us of the value of continuous rainfall records in connection with works for irrigation and water supply. It is unusual for stream flow measurements, owing to their cost, to be available, even in the most favourable circumstances, to anything like the same extent, and it is therefore very necessary that the rainfall records should be carefully discussed, and full advantage taken of all they are capable of teaching, so that when considered and compared with shorter periods of stream flow measurement (possibly only available for an adjoining catchment) the significance of the whole may be appreciated and understood. So far this has not been done in Cape Colony, from an engineering point of view, and the need of the information is felt now that the hydrographic conditions of the Colony are being investigated. From the rainfall observations so far examined, it appears that sufficient water should be available to irrigate about five million acres of arable land; and when it is considered that this means an enhanced land value in the Colony of upwards of a hundred million pounds, the advantage of setting to work at once to digest and apply the data available to specific proposals for irrigation is apparent.

IN an article on "The Amount of the Circulation of the Carbonate of Lime and the Age of the Earth," by Prof. Eug. Dubois (*K. Akad. van Wetenschappen te Amsterdam*, 1900), it is conceded that the ocean, which derives all of its carbonate of lime from rivers or the waste of sea-cliffs, holds as much of it as it can, and that rivers are incessantly bringing a surplus. A considerable amount of carbonate of lime is often to be found in the matter carried in suspension by large rivers to the ocean, and it is obvious that in these river-waters the solution must be saturated. The quantity of carbonate of lime in river-waters is naturally determined by the rocks in the drainage areas. The author gives reasons which lead him to conclude that not more than one-thirtieth part of the carbonate of lime which rivers now discharge into the ocean is newly formed from silicates, although originally all was so derived. His calculations, based on the amount of carbonate of lime annually carried to sea by rivers, show that the formation of the whole estimated minimum amount of carbonate of lime on the earth would require about 45,000,000 of years, and that of the real amount a much larger lapse of time. He estimates that 1/2,770,000th of the total quantity of carbonate of lime of the earth participates annually in the present circulation. The final result of his investigation, though admittedly only suggestive, is that the real lapse of time since the formation of a solid crust and the appearance of life upon the globe may be more than a thousand million of years.

MR. A. GIBB MAITLAND, Government geologist of Western Australia, has issued, as *Bulletin* No. 4 of the survey reports, a general account of "The Mineral Wealth of Western Australia." This work is intended to replace the useful mining handbook which was prepared by Mr. Harry P. Woodward, and has long been out of print. The author gives a sketch of the geological features of the Colony, and then deals specially with gold, lead and copper, tin, iron, miscellaneous minerals (such as antimony, zinc, &c.), coal and graphite, guano and artesian water (with records of borings). A full list of minerals is appended, and there is a map showing the distribution of useful minerals in Western Australia, and five geological maps of particular mineral districts. The guano, which is obtained from the Abrolhos Islands and elsewhere in the north, is an important product. In 1899 upwards of two thousand tons were obtained, the total value being over 5000*l*. The amount raised last year was, however, small compared with some previous records.

A REPORT on the mineral statistics and mines of Canada for 1898 (1900), drawn up by Mr. E. D. Ingall, contains records of a great variety of mineral products. It is interesting to note that the output of coal, supplied mainly from Nova Scotia (nearly two-thirds), and from British Columbia (nearly one-third), shows an increase: the total production being nearly four million tons. Natural gas is obtained from wells in southern Ontaria. Gold shows a large increase, due to the output from the Yukon; but silver, which is almost wholly derived from British Columbia, shows a decrease. On the whole, however, the growth of Canada's mineral industries is stated to be very encouraging.

IN the memoirs of the Society "Antonio Alzate" (vol. xiv.), Señor M. Moreno publishes a discussion of the sunshine values at the Observatory of Leon (Mexico), situated in latitude 21° ·07′ N., showing the daily amounts recorded by a Campbell-Stokes instrument from June 1892 to December 1898. These values are all the more acceptable from the fact that out of some thirty observatories in the Mexican Republic, Leon appears to be the only station which furnishes a complete record of sunshine. The following figures, giving the average percentages of the possible amounts, show that the locality enjoys a large amount of bright sunshine:—winter, 71; spring, 72; summer, 59; autumn, 69; and for the year, 68. In Dr. Scott's discussion of ten years' sunshine in the British Isles, the annual average for London (City) is 24; for Greenwich, 25; and for Jersey, the sunniest part of the British Isles, 40.

THE U.S. *Monthly Weather Review* for May last contains an interesting article, by Prof. C. Abbe, on the history of modern weather prediction. He considers that the first effort towards this end was the publication of the "Mannheim Ephemerides," a series of thirteen volumes, for the years 1780–92, containing detailed meteorological observations for thirty-six stations in Europe and for three stations in America. After many years, Prof. H. W. Brandes first compiled from those observations daily weather maps for 1783 ("Beiträge zur Witterungskunde," Leipzig, 1820). In 1826 Prof. J. P. Espy organised a joint committee for the purpose of studying storms; numerous maps were constructed and many published in four successive reports (1845-60). The labours of Espy and Redfield established the fact that individual features of the weather, as well as storms, move in such a manner that their approach can be predicted by means of maps. Prof. J. Henry constructed daily weather maps from telegraphic reports, for personal study, for several years from 1848, and from 1856 onwards they were exhibited at the Smithsonian Institution. These maps were made the basis of frequent special predictions of the weather for the benefit of members of Congress and others. This date brings us down to the time of the establishment of the meteorological offices in this country and abroad.

MANY interesting points referring to the work of the Government Laboratory are mentioned by the director, Dr. T. E. Thorpe, F.R.S., in the report recently issued. A number of tinned meats were examined for the Admiralty for food preservatives, but no antiseptic other than common salt was detected. Numerous butters contained boric preservative and were artificially coloured. As usual, the use of boric acid is most prevalent in butters from France, Belgium and Australia, and is very common also in Holland. The most frequent colouring-matter is annatto, but the use of coal-tar yellows appears to be on the increase, and is especially prevalent in Holland, the United States and Australia. In the course of the year it was decided by the Board of Trade that all passenger ships should be required to carry a filter capable of delivering water free from micro-organisms. With Dr. Thorpe's assistance, a filter which satisfactorily fulfils this condition has been decided upon. As a supplement to the work of the Steel Rails Committee (see p. 437), an investigation was undertaken with the object of elucidating the mode in which the phosphorus in steel is chemically combined. The inquiry clearly showed, as has already been surmised, that the phosphorus present is, like the carbon, not infrequently in more than one form of combination. The greater part of the work done in connection with the Home Office arose out of the inquiries instituted by the Home Secretary, relative to the prevalence of lead-poisoning arising from the use of lead compounds in pottery manufacture. A considerable number of "fritts" and "glazes" have been examined, and the conditions determining the ease with which lead compounds may be extracted from them by dilute acids, comparable as regards their action with that of the gastric juice and other animal solvents, have been ascertained. As the result of the inquiry made last year, the Home Secretary has required the manufacturers of pottery to abandon the use of raw lead, and in view of the facts brought to light by the examination of the fritts and glazes, he has expressed his intention of prescribing that in future such glazes shall conform to a standard of insolubility as regards lead.

THE evidence for presence of totemism in various parts of the world is now being carefully examined, as it is beginning to be realised that a cult of animals is not necessarily the same as totemism. This is the attitude taken by Dr. C. Hose and Mr. W. MacDougall in their paper read before the recent meeting of the British Association, and to which reference will be made elsewhere in our columns. Dr. E. Westermarck, the author of the well-known work on "Human Marriage," has published some of the results of his investiga tions in Morocco in a paper in the *Journal* of the Anthropological Institute (vol. xxix. p. 252), entitled "The nature of the Arab *Ginn*, illustrated by the present beliefs of the people of Morocco," in which he adopts the same conclusion. The *Gnun*, as they are called in Morocco, form a special race of beings, created before Adam. They have no fixed forms, but may assume almost any shape they like. Usually they are hurtful to man. The bad *Gnun* being always ready to attack human beings, various means are used for keeping them at a distance. The *Gnun* are afraid of salt and steel, which are consequently employed as prophylactics; the best and, from a religious point of view, the correct preventive against their attacks is the recital of passages of the Koran. Dr. Westermarck adversely criticises Robertson Smith's explanation that the *Ginn* are modernised representatives of totem animals, and states that they are beings invented to explain the wonderful and mysterious in nature. They are, in fact, survivals of the early indigenous animistic beliefs of a saltless and ironless antiquity, which, at a later date, were absorbed and developed under the influence of Islâm.

THE Society for the Protection of Birds has just issued, in pamphlet form, a communication from Sir C. Lawson, which appeared in the *Madras Mail* of March 27 and April 11, pleading for the adequate protection of insectivorous birds in India. It appears that for more than a decade a law has been in force in Madras for the protection of birds, but that when, some time ago, steps were taken to extend this enactment to the other presidencies, the responsible advisers to the Indian Government did not consider that the time was ripe for such legislation. Sir C. Lawson now urges that, in great part owing to the famine, the need of bird protection by law demands immediate recognition. At present he pleads only for those insectivorous species whose wholesale slaughter for the sake of their plumage leaves grain and cotton-fields at the mercy of insect pests, thus causing "a deplorable sacrifice of human food and the materials of human raiment, besides inflicting penury on individuals and great loss to the State." The society is endeavouring to form an Indian

branch, and applies for support to all interested in India. Of the excellency of the object in view we are fully assured, but it must be borne in mind that legislation of the nature proposed entails many difficulties in India, and should not be introduced without very mature consideration.

WE have received a *Bulletin* (vol. iii. No. 2) of the Madras Government Museum containing an illustrated account by the superintendent, Dr. E. Thurston, of the sea fisheries of Malabar and South Canara. A considerable portion of the pamphlet is taken up with an account of the instructions which have been recently drawn up by the author for the guidance of the officials at the various fish-curing establishments in attaining statistics of the life-history and migrations of the more abundant species of fish. As an instance of the difficulties encountered in India in obtaining statistics of this nature, it may be mentioned that "at the fish-census, 1889, the officer who was told off to make the record of fishes brought ashore, was at first driven away by the fishermen, who refused to give him the requisite information, from fear that the census was being taken with a view to increased taxation." The remainder of this valuable report is taken up by a diary made by the author during a tour of inspection of the fish-curing yards of the districts in question during the autumn of last year. Some of the most striking modes of fishing are illustrated in the plates, and details given of the amount and value of the catches at the different stations. Dr. Thurston is of opinion that a much greater variety of fish might be introduced with advantage at the dinner tables of Europeans residing in Madras than is at present the case.

As nest-building fishes are comparatively few, naturalists will read with interest an account given in the August issue of the *American Naturalist*, by Messrs. Young and Cole, of the manner in which the brook-lamprey (*Lampetra wilderi*) makes a structure of this nature. It is believed that the males precede the females at spawning time and commence nest-building before the arrival of the latter. The nest is made among pebbles, but it does not seem that the lampreys follow any definite plan in its construction. They affix themselves to such pebbles as require removing from the nest, and then endeavour to swim straight away with them. In the case of a heavy stone two lampreys may join forces. The number of fish in a nest may vary from one to thirty or forty; but there are generally between three and twenty-five.

A PAIR of fenestræ covered with membrane have for some time been known to occur in the head of the common cockroach, and represent functional ocelli in other species of the same group. In the *American Naturalist* for August, Mr. C. Kochi records the existence of a pair of spots in the former insect, just below the aforesaid fenestræ. These spots he believes also represent the sites of another pair of ocelli which in other insects have shifted their position and coalesced to form the unpaired median ocellus.

THE *Sunday Magazine*, like many other popular journals, publishes occasional articles on scientific subjects, the one in its September issue being devoted to swimming crabs. Excellent illustrations are given of several of the species to be met with on the British coasts, while the letterpress describes their distinctive features and the leading peculiarities in their habits.

A PAPER on the life-histories of the mosquitoes of the United States, by Dr. L. O. Howard, recently published in one of its *Bulletins* by the U.S. Department of Agriculture, appears opportunely. The writer gives concise but clear descriptions, accompanied by enlarged illustrations, of all the members of the group met with in the States, devoting special attention to those of the malaria-producing genus, Anopheles. Dr. Howard calls attention to the circumstance that he advocated the employment of kerosene for the destruction of the larvæ as far back as 1894, and claims that this mode has proved more effectual, when used on a sufficiently large scale, than any other yet suggested. In certain cases, however, as in the instance of tanks containing water intended for drinking purposes, the employment of kerosene may be undesirable, and the introduction of fish, where none previously existed, is then advocated. The value of most small fishes as destroyers of mosquito larvæ is well illustrated by a natural experiment which recently took place in Connecticut. "In this case a very high tide broke away a dyke and flooded the salt meadows of Stratford, a small town a few miles away from Bridgeport. The receding tide left two small lakes, nearly side by side and of the same size. In one lake the tide left a dozen or more small fishes, while the other was fishless. An examination in the summer of 1891 showed that while the fishless lake contained tens of thousands of mosquito larvæ, that containing the fish had no larvæ."

WE have received from the publishers two numbers of the *Zeitschrift für wissenschaftliche Zoologie*—the last of vol. lxvii. and the first of lxviii. The former contains an article, by Herr E. Wasmann, describing a new genus (Termitoxenia) of wingless Dipterous insects parasitic in the nest of white ants or termites. Four species of these remarkable insects are recognised, of which one is Indian, while the other three are from Africa. Another article in the same issue, which should be of considerable interest to stock-beeders, treats of the histology of certain infusians found in the stomachs of cattle and in the cœcum of the horse. The three articles forming the first part of vol. lxviii. are all devoted to invertebrate anatomy and morphology.

THE August issue of the *Journal* of the Royal Horticultural Society contains, in addition to numerous articles dealing with fruits, vegetables and flowers, a paper treating of the scale and mealy-bug, and a second discussing the black currant-mite and its ravages. In the latter, which should be especially valuable to horticulturists, it is stated that the origin of the pest in question is unknown, but that its first recorded occurrence in the British Isles is about fifty years ago, when it was found in Scotland.

THE Natural History and Ethnographical Museum of Para, Brazil, has commenced to issue a series of memoirs; the first of these is an account by Dr. Emilio A. Goeldi, the director of the museum, of some archæological excavations which he made in 1895 of some artificial burial caves of an extinct tribe of Indians on the Rio Cunany (Goanany). Each cave consists of a circular shaft, 8 feet 2½ inches deep and 3 feet 4½ inches in diameter, the opening of which was closed by a large disc of granite. A crescentic chamber had been cut in the soil at the base of the shaft, in which were deposited a number of remarkable earthen vessels of very varied form, most of which were painted in red with peculiar designs and patterns. Some of the funeral vases were conventionally modelled to represent the human form, and others had on them various animals moulded in high relief. The memoir is illustrated by capital plates.

MESSRS. G. W. WILSON, of Aberdeen, have just issued a catalogue of more than seven hundred new lantern slides representing scenes and objects in Spain. The list should be of particular interest to teachers of geography.

WE have received the Annual Reports of the Royal Botanic Garden, Calcutta, from the superintendent, Major Prain, for the years 1898-1899, 1899-1900. Close attention has been given by the garden staff throughout the past year to the propagation and distribution of plants of economic importance.

AFTER an interval of about two years, Sir George King, late superintendent of the Royal Botanic Garden, Calcutta, continues, in the *Journal* of the Asiatic Society, Bengal, his materials for a flora of the Malayan Peninsula. The present part consists of a monograph of the Malayan species of Melastomaceæ, prepared with the assistance of Dr. O. Stapf, of the Kew Herbarium.

IN an article on the fertilisation of *Peronospora parasitica* in the *Annals of Botany* for June, Mr. Harold Wager points out that there are at present known three distinct types of fertilisation in the Peronosporeæ. In the first, represented by *Peronospora parasitica*, the oosphere and oospore are uninucleate, and fusion takes place between two nuclei only. In the second type the oosphere is uninucleate and the oospore multinucleate, and fusion is effected between two nuclei only. In the third type the oosphere and oospore are both multinucleate, and fusion takes place between a number of nuclei in pairs.

IN a paper recently read before the Linnean Society, on the origin of the Basidiomycetes, Mr. G. Massee points out the connection between the Hyphomycetes and the Protobasidiomycetes. The conidial forms of many Hyphomycetes are true Protobasidiomycetes. There is no evidence that the Autobasidiomycetes are in any way descended from the Protobasidiomycetes; while, on the other hand, there are indications that the Autobasidiomycetes may probably have been derived by gradual modifications of the spore-bearing organs or oasids of conidial forms of certain ascigerous fungi.

PROF. J. J. THOMSON'S inspiring work on "The Discharge of Electricity through Gases" (Constable and Co.) has been translated into French by Dr. L. Barbillion, and published by MM. Gauthier-Villars under the title "Les Décharges électriques dans les Gaz." Dr. Barbillion adds a few notes, and Dr. C. E. Guillaume contributes a preface. The original volume was reviewed in NATURE of January 12, 1899 (vol. lix. p. 241), and the translation will doubtless be received by French physicists with the same appreciation as the work has commanded in Great Britain.

SEVERAL articles of real interest to students of science and philosophy have appeared in recent numbers of *The Open Court*. The August number contained an account of Galileo in which his work is presented in new aspects, and the opposition to his conclusions as to the movements of the earth and the character of the visible universe is in some part explained. The current number contains an instructive contribution on Greek religion and mythology, by the editor, Dr. Paul Carus, and one on animism in popular thought and in science, by Prof. E. Mach. Many of the articles in the magazine are excellently illustrated.

AN atlas for druggists and students of pharmacy, by Prof. Ludwig Koch, is in course of publication by the firm of Gebrüder Borntraeger, Leipzig, under the title of "Die mikroskopische Analyse der Drogenpulver." The first volume is to be devoted to barks and woods, and the second part of it, containing six plates, has just appeared.

THE third and fourth parts of Dr. Chun's elaborate account of the German *Valdivia* expedition have just been published by the firm of Gustav Fischer, Jena. The parts are illustrated with numerous half-tone figures and some very fine plates, and the work promises to be a very attractive narrative of an extensive voyage.

THE additions to the Zoological Society's Gardens during the past week include a Sooty Mangabey (*Cercocebus fuliginosus*) from West Africa, presented by Mr. B. Stewart; a Squacco Heron (*Ardea ralloides*), South European, presented by Mr. A. F. Putz; a Black-headed Terrapin (*Damonia reevesi unicolor*) from China, an Algerian Skink (*Eumeces algeriensis*) from North-west Africa, a Common Chameleon (*Chamaeleon vulgaris*) from North Africa, presented by Mr. F. J. Bridgman; an European Pond Tortoise (*Emys orbicularis*), European, presented by Miss F. M. Weippert; a Wall Lizard (*Lacerta muralis*), a Tessellated Snake (*Tropidonotus tessellatus*), European, presented by Mr. Walter Hunter; two Badgers (*Meles taxus*), British; two Indian Fruit Bats (*Pteropus medius*) from India, three Black-spotted Teguexins (*Tupinambis nigropunctatus*) from South America, two Antillean Boas (*Boa diviniloqua*) from the West Indies, five Undulated Lizards (*Sceloporus undulatus*) from South-east United States, deposited.

OUR ASTRONOMICAL COLUMN

EPHEMERIS FOR OBSERVATIONS OF EROS:—

1900.	R.A. h. m. s.	Decl. ° ′
Sept. 20 ...	2 39 43 ...	+40 47·1
21 ...	40 20 ...	41 9·9
22 ...	40 55 ...	41 32·8
23 ...	41 27 ...	41 55·7
24 ...	41 56 ...	42 18·6
25 ...	42 23 ...	42 41·4
26 ...	42 46 ...	43 4·2
27 ...	43 7 ...	43 27·0
28 ...	43 25 ...	43 49·7
29 ...	43 40 ...	44 12·3
30 ...	2 43 51 ...	+44 34·8

SWIFT'S COMET (1892 I.).—In the *Annals of Harvard College Observatory* (vol. xxxii. Part ii. pp. 267–295), Prof. W. Pickering describes the photographs obtained of this comet at Arequipa during March and April 1892, illustrating his remarks by reproductions from nine of the negatives.

The plates were taken with four instruments—the 13-inch Boyden telescope, 8-inch and 2·5-inch doublets, and a 20-inch reflector; two photographs were also obtained with the 8-inch refractor provided with an objective prism of 13° refracting angle. The exposures varied from 5 to 133 minutes.

While the comet was easily visible to the naked eye, it was carefully examined with a double image prism, but no traces of polarisation could be detected in either the head or tail. The nucleus was yellowish-green in colour, giving out a triangular jet towards the sun.

The head was distinctly divisible into three parts—nucleus, bright primary envelope and an outer fainter one. The tail was composed of two sets of rays having distinctly different origins. The brighter of these sets, forming what may be called the "inner" tail, took its origin from the rear side of the inner envelope, and in some of the photographs this attains the great length of over 20° of arc. The rays were absolutely straight so far as could be determined from the photographs, and were inclined to each other about 10°. The outer tail sprung from the external faint envelope, and, in contrast to the other, was marked by conspicuous deep and wide rifts between the rays composing it.

Prof. Pickering thinks that certain periodic differences in appearance are caused by a rotation of the comet about an axis passing longitudinally through the tail. Comparisons of the Arequipa photographs with others obtained by Dr. Wolf and Prof. Barnard show that it is quite possible to detect changes from one hour to another, and from a detailed examination of the angular deviation of the rays it is probable that the rotation period is about 94-97 hours.

The photograph taken April 14 shows a strong deflection of the inner tail, but the absence of other photographs near that date render it impossible to trace the cause, and the phenomenon was not subsequently repeated.

In general, it was impossible to identify any particular feature on two successive days, but on April 6, 7, 8, a bright condensation was noticed each day, and its distance from the nucleus of the comet was found to increase day by day. These displacements were carefully measured, converted into kilometres by reference to the comet's elements, and an estimate made of the amount of the repulsive force exerted upon the comet's tail by the sun. This indicated the total repulsive force to be about 39·5 times the gravitational force. The spectrum photographs have been difficult to reduce, but the brightest region of the spectrum appears as an intense and very narrow line about λ 3890. No indications of the hydrogen lines were seen.